DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of species in the reply filed on January 14, 2008 is acknowledged.

The traversal is on the ground(s) that the embodiment of Figure 15 closely overlaps that of Figures 13, especially when the claims are considered. Given this similarity and the expected overlap of searching classes/subclasses, it is respectfully that the examiners reconsider the restriction and recombine at least Species IV and II. The examiners agree with the applicants.

The traversal is on the ground(s) that the restriction of Species I-IV, Figures 7, 13, 17 and 15 does not make sense since the hardware shown therein can be used with any of the medical end use species. This is not found persuasive because the examiner believe are represented different species (Species I, III, V, VI and VII, shown on Figures 7, 14, 16, 17 and 18) where not considered by the examiner because is a considered different species and is clear the specification has different species and it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

The traversal is on the ground(s) that the applicant elects Figure 15, based on election of the applicant; the examiner verified claims 1 – 99 carefully and determined that claims 1 – 4, 7 – 9, 11, 14, 26—33, 47 – 53, 57, 59, 60, 63, 65, 68, 70, 77 – 80 and 92 – 99 reads in the Figure 15 that the applicant elected. This is not found persuasive because the examiner believe claims *5, 34 – 46, 54, 56, 66, 71 - 76, 79 – 90 are* represented different species (Species I, III, V, VI and VII, shown on Figures 7, 14, 16, 17 and 18) where not considered by the examiner because is a considered different species.

Claims 6, 10, 12, 13, 15 – 25, 55, 58, 61 – 62, 64, 67, 69 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on January 14, 2008.

Priority

The priority has been considered by the examiner.

Drawings

The drawings submitted on March 24, 2004 have been considered by the examiner

Information Disclosure Statement

The references cited in the Information Disclosure Statement (IDS) have been considered by the examiner.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

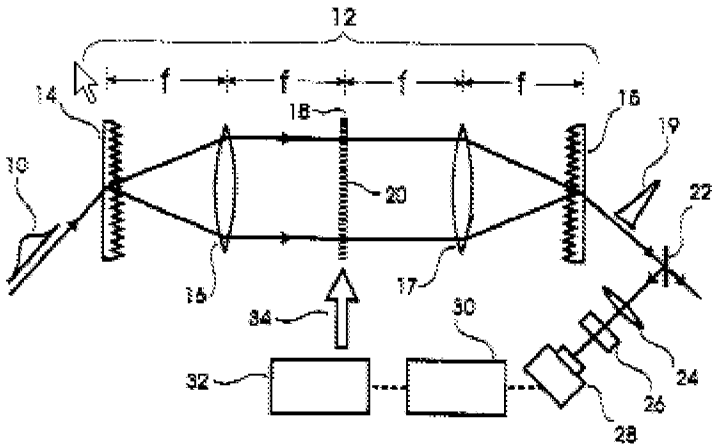
> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 – 4, 7 – 9, 11, 14, 26 – 33, 47 – 51, 53, 57, 59, 60, 62, 68, 70, 77 – 80 and 92 – 99 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silberberg et al. (6,327,068) in views of A. M. Weiner "Femtosecond pulse shaping using spatial light modulators", pages 1929—1957.

Regarding claims 1 and 2, Silberberg discloses a system comprising: a laser (the reference do not show a laser, but show the pulse and the pulse come from the laser) operable to emit a femtoseconds laser beam pulse (see Fig. 1, Character 10 and Column 2, Lines 15 – 16); and a controller (see Fig. 1, Character 32, the reference call "computer") the functional recitation that "operable to control the laser and the shaper" is

insufficient to patentable distinguish the claimed apparatus from the apparatus disclosed by (SMITH)"because it is narrative in form. In order to be given patentable weight, a functional recitation must be expressed as a "means" for performing the specified function, as set forth 35 U.S.C. 112, 6th paragraph, and must be supported by recitation in the claim of sufficient structure to warrant the presence of the functional language. In re Fuller, 1929 C.D. 172; 388 O.G. 279.

Silberberg discloses the claimed invention except binary phase shaper. Weiner teach a binary phase shaper. However, it is well known in the art to apply binary phase shaper as discloses by Weiner in page 1934, third paragraph. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was to apply the well known binary phase shaper as suggested by Weiner the laser of Silberberg, because could be used produce waveforms with symmetrical intensity profiles, while gray-level phase (typically with four or more phase levels) can be used for generating pulse trains and other waveforms with asymmetrical intensity profiles and could be used to intensify profile of the projection light beam.



Regarding claim 3, Silberberg discloses a multiphoton intrapulse interference phase scan (Silberberg discloses the structural (the pulse shaper (12), Column 5, Lines 15 – 33) and SHG (Column 6, Lines 19 – 24) which will implicitly provide a similar output of the multiphoton intrapulse interference) arrangement as claimed, which will *implicitly* provide a similar output of the multiphoton intrapulse interference) for pulse characterization and compensation.

Regarding claims 4, 48, Silberberg discloses evolutionary learning calculations (Silberberg discloses the computer and the computer has a program to evolutionary learning calculations which will implicitly provide calculations needed).

Regarding claims 7, 8, 60, Silberberg discloses the pulse shaper has one of the following pixel resolutions; (a) about 128 (Column 5, Lines 42) and the bandwidth of the laser is dispersed across all pixels of the phase modulator (Column 5, Lines 39 – 49).

Regarding claims 9, 11 and 14, Silberberg discloses the system is employed in optical coherence tomography, functional imaging and photodynamic therapy, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex Parte Masham, 2 USPQ F.2d 1647 (1987).

Regarding claims 26, 29 – 32, Silberberg discloses a system for use with living tissue, the system comprising: a high peak intensity laser (the reference do not show a high peak intensity laser, but show the pulse and the pulse come from the femtoseconds laser and the femtoseconds laser is a high peak intensity laser) beam pulse (see Fig. 1, Character 10 and Column 2, Lines 15 – 16); and a device (see Fig. 1, Character 12) operable to change a characteristic of the pulse prior to emission of the pulse upon the living tissue through use of multiphoton intrapulse interference, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex Parte Masham, 2 USPQ F.2d 1647 (1987), wherein nonlinear transitions (Column 2, Lines 38 – 57) induced by each pulse are controlled by phase shaping (see Fig. 1, Character 12, Column 5, Lines 15 – 33).

Silberberg discloses the claimed invention except binary phase shaper. Weiner teach a binary phase shaper. However, it is well known in the art to apply binary phase shaper as discloses by Weiner in page 1934, third paragraph. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was to apply the well known binary phase shaper as suggested by Weiner the laser of Silberberg, because could be used produce waveforms with symmetrical intensity profiles, while gray-level phase (typically with four or more phase levels) can be used for generating pulse trains and other waveforms with asymmetrical intensity profiles and could be used to intensify profile of the projection light beam.

Regarding claim 27, Silberberg discloses a device uses a pulse shaper and the desired excited substances in the tissue undergo two photon absorption, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex Parte Masham, 2 USPQ F.2d 1647 (1987).

Regarding claim 28, Silberberg discloses the pulse has duration of less than fifty one femtoseconds (Column 7, Lines 44 – 55).

Regarding claim 33, Silberberg discloses the multiphoton intrapulse interference (Silberberg discloses the structural (the pulse shaper (12, Column 5, Lines 15 – 33) and SHG (Column 6, Lines 19 – 24) which will implicitly provide a similar output of the multiphoton intrapulse interference) to operably activates desired photodynamic therapy agents at desired tissue depths, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex Parte Masham, 2 USPQ F.2d 1647 (1987).

Regarding claims 47 and 49 - 50, Silberberg discloses a method for microscopy of a target material containing probes that are excitable by multi-photon excitation, the

method comprising: generating a laser pulse (the reference do not show a laser, but show the pulse and the pulse come from the laser); shaping the pulse (see Fig. 1, Character 12, Column 5, Lines 15 – 33); directing the shaped pulse (see Figure. 1, Character 28) at the target (Column Lines 6 - 27, the reference call "sample"); and detecting (see Figure. 1, Character 28) emissions from the target (Column Lines 6 - 27, the reference call "sample").

Silberberg discloses the claimed invention except binary phase shaper. Weiner teach a binary phase shaper. However, it is well known in the art to apply binary phase shaper as discloses by Weiner in page 1934, third paragraph. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was to apply the well known binary phase shaper as suggested by Weiner the laser of Silberberg, because could be used produce waveforms with symmetrical intensity profiles, while gray-level phase (typically with four or more phase levels) can be used for generating pulse trains and other waveforms with asymmetrical intensity profiles and could be used to intensify profile of the projection light beam.

Regarding claims 51, 59, Silberberg discloses a shaping the pulse with a spatial light modulator (see Figure. 1, Character 18, Column 5, Lines 14 – 29, “Spatial Light Modulator = SLM”).

Regarding claim 53, 57 and 77 – 80, Silberberg discloses a method of pulse shaping, the method comprising: emitting a laser (the reference do not show a laser, but

show the pulse and the pulse come from the laser) pulse having a duration less than 100 femtoseconds (Column 7, Lines 44 – 55); directing the pulse into a pulse shaper (see Fig. 1, Character 12, Column 5, Lines 15 – 33); characterization of the pulse using multi-photon intrapulse interference phase scan (Silberberg discloses the structural (the pulse shaper (12, Column 5, Lines 15 – 33) and SHG (Column 6, Lines 19 – 24) which will implicitly provide a similar output of the multiphoton intrapulse interference phase scan); and shaping the pulse by only two phase values (see Fig. 1, Character 12, Column 5, Lines 15 – 33).

Regarding claims 63, 65, and 68 Silberberg discloses a using the shaped pulse in photodynamic therapy on living tissue, optical coherent tomography, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex Parte Masham, 2 USPQ F.2d 1647 (1987).

Regarding claim 70, Silberberg discloses the claimed invention except binary phase shaper. Weiner teach a binary phase shaper. However, it is well known in the art to apply binary phase shaper as discloses by Weiner in page 1934, third paragraph. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was to apply the well known binary phase shaper as suggested by Weiner the laser of Silberberg, because could be used produce waveforms with

symmetrical intensity profiles, while gray-level phase (typically with four or more phase levels) can be used for generating pulse trains and other waveforms with asymmetrical intensity profiles and could be used to intensify profile of the projection light beam.

Regarding claim 92, Silberberg discloses a system comprising: a laser (the reference do not show a laser, but show the pulse and the pulse come from the laser) operably emitting a laser beam pulse (see Figure. 1, Character 10) of less than 51 femtoseconds (Column 7, Lines 44 – 55); a pulse shaper (see Fig. 1, Character 12, Column 5, Lines 15 – 33) operably controlling a spectral phase of the pulse; a detector (see Figure. 1, Character 28) operably detecting a spectrally dispersed second harmonic of the shaped pulse (Column 4, Lines 8 – 19 and Column 6, Lines 19 - 27); and a controller (see Figure. 1, Character 32, the reference call "computer") connected to the shaper (see Figure. 1, Character 12) and detector (see Figure. 1, Character 28), the controller operably controlling the shaper (see Figure. 1, Character 12) to introduce multiphoton intrapulse interference (Silberberg discloses the structural (the pulse shaper (12, Column 5, Lines 15 – 33) and SHG (Column 6, Lines 19 – 24) which will implicitly provide a similar output of the multiphoton intrapulse interference) to the pulse.

Regarding claim 93, Silberberg discloses the pulse has duration less than 10 femtoseconds (Column 7, Lines 44 – 55).

Regarding claim 94, Silberberg discloses selectively reducing three or more photon excitation (Column 4, Lines 23 – 31)

Regarding claims 95 – 99, Silberberg discloses a calibrated reference spectral phase in the pulse shaper is used to retrieve an unknown spectral phase in subsequent pulses, further comprising using a reference spectral phase including a sinusoidal function with the pulse shaper, further comprising using a reference spectral phase including a cubic function with the pulse shaper, further comprising a retrieved unknown spectral phase in the pulse is used to calculate a compensation phase that cancels spectral phase distortions in subsequent laser beam pulses, further comprising using the shaper and controller to conduct multiphoton intrapulse interference phase scans on subsequent laser beam pulses in an iterative manner to improve the quality of pulse control, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex Parte Masham, 2 USPQ F.2d 1647 (1987).

Claim 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over are rejected under 35 U.S.C. 103(a) as being unpatentable over Silberberg et al. (6,327,068) in view of Kappel et al (5,704,700) further in view of Miyai (2001/0015990).

Regarding claim 52, Silberberg discloses the claimed invention except confocal microscope. Miyai teach a confocal microscope. However, it is well known in the art to apply confocal microscope as discloses by Miyai in paragraph [0003]. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was to apply the well known confocal microscope as suggested by Miyai to the laser of Silberberg, because could be used to focus on much narrower region than usual microscopes see Paragraphs [003] of Miyai.

Response to Arguments

Applicant's arguments filed January 14, 2008 have been fully considered but they are not persuasive. The applicant elects Figure 15, based on election of the applicant; the examiner verified claims 1 – 99 carefully and determined that claims 1 – 4, 7 – 9, 11, 14, 26—33, 47 – 53, 57, 59, 60, 63, 65, 68, 70, 77 – 80 and 92 – 99 reads in the Figure 15 that the applicant elected. However, the examiner believe claims *5, 34 – 46, 54, 56, 66, 71 - 76, 79 – 90 are* represented different species (Species I, III, V, VI and VII, shown on Figures 7, 14, 16, 17 and 18) where not considered by the examiner because is a considered different species.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Delma R. Fordé whose telephone number is (571) 272-1940. The examiner can normally be reached on M - F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Min Sun Harvey can be reached on (571) -272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.
Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Delma R. Fordé/
Examiner, Art Unit 2828
April 22, 2008

/Minsun Harvey/
Supervisory Patent Examiner, Art Unit 2828